This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-44 (cancelled)

Claim 45 (currently amended): An arrangement for distance measurements using a frequency shifted laser radiation source, said arrangement comprising:

an object detection sensor;

a frequency shifted feedback laser resonator having a pumped gain medium therein with a gain greater than unity so as to emit laser light having a plurality of frequency components changing with time in a chirping manner;

means for splitting said emitted laser light having said plurality of frequency components changing with time in a chirping manner into an object beam for irradiating an object and a reference beam, the object sensor being adapted to receive laser light radiation coming back from an object illuminated with the object beam light and being at a distance to be determined and also being adapted to receive said reference beam via a reference path not including the object in such a manner that the laser light radiation coming back from the object and the reference beam interfere with one another on the object sensor, said interference producing a signal by the beating of a plurality of frequency components that change with time in a chirping manner and which comprise laser light radiation coming back from said object illuminated with the object beam and beating with the plurality of frequency components that change with time in a chirping manner and which comprise the reference beam received at the sensor via said reference path not including the object, the intensity of said beat signal allowing for the determination of the distance of the object in response to the intensity of said beat signal;

wherein the frequency shifted feedback laser radiation source further comprises a means for injection of narrow banded, non-pumping, modulated seed laser light into the frequency shifted feedback resonator, said means for injection ~~comprising a means for~~

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~~modulation of the narrow banded non-pumping seed laser light,~~ modulating the seed laser light such that said intensity of said beat signal is increased.

Claim 46 (currently amended): The arrangement according to claim 45, wherein ~~the means for modulating the seed laser light is a means for phase modulation of~~ the seed laser light is phase modulated.

Claim 47 (previously presented): The arrangement according to claim 45, wherein the seed light has a wavelength close to the wavelength where the gain of the pumped gain medium is unity so that amplification of the seed laser light occurs at latest after a few resonator round trips.

Claim 48 (currently amended): The arrangement according to claim 45 or 47, wherein the ~~means for modulation is adapted to modulate~~ the seed laser light is modulated around a signature frequency of

$$\delta v = \alpha \times c \times \delta_1,$$

wherein

α = chirp rate,

c = speed of light, and

δ_1 = distance to be determined.

Claim 49 (previously presented): The arrangement according to claim 48, wherein the modulation frequency is periodically varied around the signature frequency of $\delta v = \alpha \times c \times \delta_1$.

Claim 50 (currently amended): The arrangement according to claim 48, wherein ~~a means is provided for changing~~ the seed modulation frequency is changed in a stepwise manner and wherein said means for changing is adapted to maintain the seed modulation frequency constant for a given measuring time T and/or to wobble around an average value of a respective seed modulation frequency value.

Claim 51 (previously presented): The arrangement according claim 48, wherein the injection laser is a single mode laser.

Claim 52 (previously presented): The arrangement according claim 51, wherein the means for injection is a laser that has a frequency width of less than 5 % of the gain of the frequency shifted feedback laser radiation gain medium.

Claim 53 (previously presented): The arrangement according claim 52, wherein the injection laser injects the non-pumping injection laser light into the gain medium of the frequency shifted feedback laser.

Claim 54 (previously presented): The arrangement according to claim 45, including a filter for filtering the beat intensity related object sensor signals determined at the object detecting sensor.

Claim 55 (previously presented): The arrangement according to claim 54, wherein the filter is adapted for filtering of components changing with the seed frequency.

Claim 56 (previously presented): The arrangement according to claim 55, including a signal amplification for an object detection sensor signal having an amplification stage subsequent to a filter stage and at least one regulating or control circuit for setting a given amplification of the sensor signal.

Claim 57 (previously presented): The arrangement according to claim 56, including a stage for determining a distance in response to an object detection sensor signal signature as a function of seed frequencies.

Claim 58 (previously presented): The arrangement according to claim 57, wherein the stage for determining the distance according to the object detection sensor signal signature in response to the seed frequency is adapted to determine the distance in response to reaching a maximum value of the object detecting sensor signal at a given frequency and/or in response

to the given amplification value of the object detection sensor signal when changing the seed frequency and/or in response to a value within a frequency window around the seed frequency and/or in response to the strength of the seed frequency component in the object detecting sensor signal.

Claim 59 (previously presented): A method for position sensitive object distance determination using a frequency shifted feedback laser radiation from a frequency shifted feedback laser for object irradiation with laser radiation usable for distance measurement and a position sensitive object detection sensor;

wherein said laser radiation is split into an object beam for irradiating an object and a reference beam and the object beam is directed onto an object, and wherein laser radiation coming in from the object illuminated with said object beam is brought into interference with said reference beam at a position sensitive sensor and an intensity of the beat signal of said laser radiation coming in from the object illuminated with said object beam interfering with laser radiation coming in not from the object at the position sensitive sensor is determined as a distance indicative signal;

and wherein the intensity of said beat signal is increased beyond variations obtainable by fluctuations of the frequency shifted feedback radiation source by providing a modulation at the frequency shifted feedback radiation source for object irradiation.

Claim 60 (currently amended): An arrangement for distance measurements using a frequency shifted laser for distance measurements, comprising:

a frequency shifted feedback laser resonator having a pumped gain medium therein with a gain greater than or equal to unity so as to emit frequency shifted laser light changing with time in a chirping manner;

a means for splitting said emitted frequency shifted laser light changing with time in a chirping manner into an object beam for irradiating an object and a reference beam;

and an object detection sensor which receives laser light radiation coming back from an object illuminated with the object beam light and being at a distance to be determined and which object detection sensor also receives said reference beam via a reference path not including the object in such a manner that the laser light radiation coming back from the

object and the reference beam interfere with one another, said interference producing a beat signal, said beat signal having a signal intensity allowing for the determination of the distance of the object in response to the intensity of the beat signal; and

wherein the frequency shifted feedback laser radiation source further comprises a means for injection of narrow banded, non-pumping, modulated seed laser light into the frequency shifted feedback resonator, said means for injection ~~comprising a means for modulation of the narrow banded non-pumping~~ modulating the seed laser light such that said beat signal intensity is increased.

Claim 61 (previously presented): The arrangement according to claim 60, wherein the seed light has a wavelength close to the wavelength where the gain of the pumped gain medium is unity so that amplification of the seed laser light occurs at latest after a few resonator round trips.

Claim 62 (currently amended): The arrangement according to claim 60, wherein the ~~means for modulation is adapted to vary the modulation frequency~~ seed laser light is modulated around a signature frequency of

$\delta\nu = \alpha \times c \times \delta_1$,

wherein

α = chirp rate,

c = speed of light, and

δ_1 = distance to be determined.

Claim 63 (previously presented): The arrangement according to claim 62, wherein the modulation frequency is periodically varied around the signature frequency of $\delta\nu = \alpha \times c \times \delta_1$.

Claim 64 (currently amended): The arrangement according to claim 63, wherein the ~~means for modulation is adapted to vary the~~ seed laser light is modulated with a periodically varying modulation frequency ~~periodically linear with time~~.

Claim 65 (previously presented): The arrangement according claim 60, wherein the injection laser has a frequency width of less than 5 % of the gain of the frequency shifted feedback laser radiation gain medium.

Claim 66 (previously presented): The arrangement according claim 65, wherein the injection laser is a single mode laser.

Claim 67 (previously presented): The arrangement claim 60, wherein the gain medium of the frequency shifted feedback laser is an optical fiber internal to the resonator and/or constituting the resonator.

Claim 68 (currently amended): An arrangement for distance measurements using a frequency shifted laser for distance measurements, comprising:

a frequency shifted feedback laser resonator having a pumped gain medium therein so as to emit frequency shifted laser light changing with time in a chirping manner;

a means for splitting said emitted frequency shifted laser light changing with time in a chirping manner into an object beam for irradiating an object and a reference beam;

and an object detection sensor which receives laser light radiation coming back from an object illuminated with the object beam light and being at a distance to be determined and which object detection sensor also receives said reference beam via a reference path not including the object in such a manner that the laser light radiation coming back from the object and the reference beam interfere with one another, said interference producing a beat signal, said beat signal allowing for the determination of the distance of the object in response to the beat signal;

wherein the frequency shifted feedback laser radiation source further comprises a means for injection of narrow banded, non-pumping, modulated seed laser light into the frequency shifted feedback resonator, and said means for injection ~~comprising a means for modulation of the narrow banded non-pumping~~ modulates the seed laser light such that said beat signal is increased,

and the arrangement further comprises a stage for changing the seed frequency with time and an object detection sensor signal evaluation stage for determining as a distance

related measurement value a value representative for the time until a predetermined object signature is obtained by measuring the time until a maximum or threshold value is reached; and

an analog maximum hold circuit for detection of a temporal signal curve having a related digital register for writing in of a sweep time or counter value for the seed frequency and further having a circuit for determination of a sweep-time or counter value for the seed frequency to be registered in response to reaching an analog threshold or maximum value, or wherein a derivation stage for deriving of the frequency dependent object detection sensor signal signature is provided.

Claim 69 (previously presented): The arrangement according to claim 68, wherein the object detection sensor is adapted for receiving and/or for evaluation of radiation received back from the irradiation of the object on the one hand and other light received back from the object on the other hand, simultaneously or in a timely close sequential manner; and wherein a frequency shifted feedback radiation source is adapted for emission in the infrared range and the object detection sensor is further adapted for receiving a visible light as said other light from the object.

Claim 70 (currently amended): An arrangement for distance measurements using a frequency shifted laser radiation source, said arrangement comprising:

an object detection sensor;

a frequency shifted feedback laser resonator having a pumped gain medium therein with a gain greater than unity so as to emit laser light having a plurality of frequency components changing with time in a chirping manner;

means for splitting said emitted laser light having said plurality of frequency components changing with time in a chirping manner into an object beam for irradiating an object and a reference beam, the object sensor being adapted to receive laser light radiation coming back from an object illuminated with the object beam light and being at a distance to be determined and also being adapted to receive said reference beam via a reference path not including the object in such a manner that the laser light radiation coming back from the object and the reference beam interfere with one another on the object sensor, said

interference producing a signal by the beating of a plurality of frequency components that change with time in a chirping manner and which comprise laser light radiation coming back from said object illuminated with the object beam and beating with the plurality of frequency components that change with time in a chirping manner and which comprise the reference beam received at the sensor via said reference path not including the object, the intensity of said beat signal allowing for the determination of the distance of the object in response to the intensity of said beat signal;

wherein the frequency shifted feedback laser radiation source further comprises a means for injection of narrow banded, non-pumping, modulated seed laser light into the frequency shifted feedback resonator, said means for injection ~~comprising a means for modulation of the narrow banded non-pumping seed laser light,~~ modulating the seed laser light such that said intensity of said beat signal is increased;

a filter for filtering the beat intensity related object sensor signals determined at the object detecting sensor wherein the filter is adapted for filtering of components changing the seed frequency;

a signal amplifier for an object detection sensor signal having an amplification stage subsequent to a filter stage and at least one regulating or control circuit for setting a given amplification of the sensor signal;

a stage for determining a distance in response to an object detection sensor signal signature as a function of seed frequencies, wherein the stage for determining the distance according to the object detection sensor signal signature in response to the seed frequency is adapted to determine the distance in response to reaching a maximum value of the object detecting sensor signal at a given frequency and/or in response to the given amplification value of the object detection sensor signal when changing the seed frequency and/or in response to a value within a frequency window around the seed frequency and/or in response to the strength of the seed frequency component in the object detecting sensor signal;

a stage for changing the seed frequency with time is provided and an object detection sensor signal evaluation stage determines as a distance related measurement value a value representative for the time until a predetermined object signature is obtained by measuring the time until a maximum or threshold value is reached; and

an analog maximum hold circuit for detection of a temporal signal curve having a related digital register for writing in of a sweep time or counter value for the seed frequency and further having a circuit for determination of a sweep-time or counter value for the seed frequency to be registered in response to reaching an analog threshold or maximum value, or wherein a derivation stage for deriving of the frequency dependent object detection sensor signal signature is provided.

Claim 71 (previously presented): The arrangement according to claim 70, wherein:

the object detection sensor is adapted for receiving and/or for evaluation of radiation received back from the irradiation of the object on the one hand and other light received back from the object on the other hand, simultaneously or in a timely close sequential manner;

and a frequency shifted feedback radiation source is adapted for emission in the infrared range and the object detection sensor is further adapted for receiving visible light as said other light from the object.

Claim 72 (currently amended): An arrangement for distance measurements using a frequency shifted laser radiation source, said arrangement comprising:

an object detection sensor;

a frequency shifted feedback laser resonator having a pumped gain medium therein with a gain greater than unity so as to emit laser light having a plurality of frequency components changing with time in a chirping manner;

means for splitting said emitted laser light having said plurality of frequency components changing with time in a chirping manner into an object beam for irradiating an object and a reference beam, the object sensor being adapted to receive laser light radiation coming back from an object illuminated with the object beam light and being at a distance to be determined and also being adapted to receive said reference beam via a reference path not including the object in such a manner that the laser light radiation coming back from the object and the reference beam interfere with one another on the object sensor, said interference producing a signal by the beating of a plurality of frequency components that change with time in a chirping manner and which comprise laser light radiation coming back from said object illuminated with the object beam and beating with the plurality of frequency

components that change with time in a chirping manner and which comprise the reference beam received at the sensor via said reference path not including the object, the intensity of said beat signal allowing for the determination of the distance of the object in response to the intensity of said beat signal;

wherein the frequency shifted feedback laser radiation source further comprises a means for injection of narrow banded, non-pumping, modulated seed laser light into the frequency shifted feedback resonator, said means for injection ~~comprising a means for modulation of the narrow banded non-pumping~~ <u>phase modulating the</u> seed laser light, such that said intensity of said beat signal is increased;

~~wherein the means for modulating the seed laser light is a means for phase modulation of the seed laser light;~~

wherein the ~~means for modulation is adapted to modulate~~ <u>seed laser light is modulated</u> around a signature frequency of

$\delta\nu = \alpha \times c \times \delta_1$,

wherein

α = chirp rate,

c = speed of light, and

δ_1 = distance to be determined; and

including a stage for determining a distance in response to an object detection sensor signal signature as a function of seed frequencies, wherein the stage for determining the distance according to the object detection sensor signal signature in response to the seed frequency is adapted to determine the distance in response to reaching a maximum value of the object detecting sensor signal at a given frequency and/or in response to the given amplification value of the object detection sensor signal when changing the seed frequency and/or in response to a value within a frequency window around the seed frequency and/or in response to the strength of the seed frequency component in the object detecting sensor signal.